Small Business Innovation Research/Small Business Tech Transfer

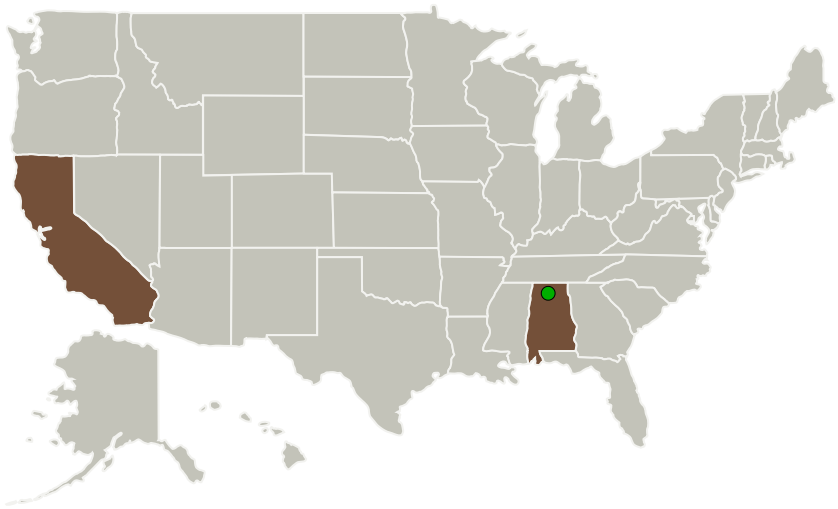
Engineered Alloy Structures by Friction Stir Reaction Processing, Phase I

Completed Technology Project (2017 - 2017)

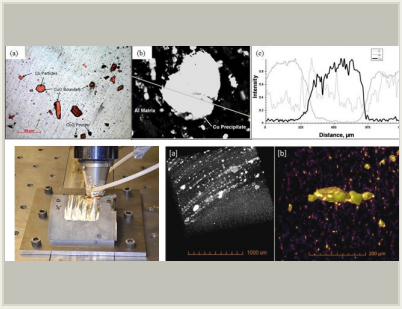
Project Introduction

This SBIR Phase I effort examines the feasibility of an innovative surface modification technology incorporating friction stir reaction processing for producing engineered alloy structures, or conventional parts with strategically enhanced locations for wear, environmental, and/or creep-fatigue resistance. Friction stir reaction processing is an emerging microstructural modification technique based on the solid state friction stir welding and friction stir processing. It can be applied to enhance the microstructure-properties of the parent material through the introduction of nano-particles into the "weld" thus improve the damage tolerance capabilities of the reinforced region. This separate step allows high value parts to have tailored microstructure-properties based on component region-specific requirements, as opposed to one set of microstructure-properties fits all as a compromise.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Transition45 Technologies, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Orange, California
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama



Engineered Alloy Structures by Friction Stir Reaction Processing, Phase I Briefing Chart Image

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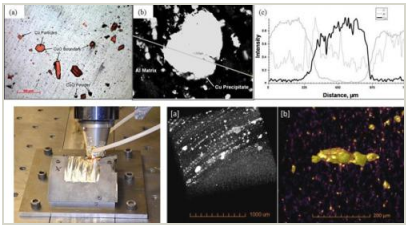
Primary U.S. Work Locations	
Alabama	California

Images



Briefing Chart Image
Engineered Alloy Structures by Friction Stir Reaction Processing, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/134511)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Transition45 Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

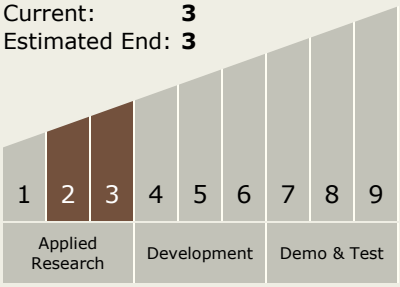
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Edward Chen

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System